



COST Action E36 Modelling and Simulation in the Pulp and Paper Industry

Work Group C – Use of Simulation Software in the Pulp & Paper Industry

Users' Requirements for Simulation Software

Report from surveys elaborated at COST Action E36,
Work Group C

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October 2005

Preface

The purpose of this report is to give an overview of the requirements that different users' groups have for simulation software. Different criteria have been analysed in order to classify them by their importance to the users. This preliminary report is an analysis of all the questionnaires received from different people at DOTS-ATIP Conference held at 'Palace du Menthon' in Annecy (France), on April 2005. (Annex 1 shows this questionnaire). This report shows a brief study over different criteria, that will be completed after the reception of more replies. Period for receiving replies expires 1st September 2006.

This report has been carried out with 46 replies from people from 10 different countries:

- Denmark
- England
- Finland
- France
- Germany
- Norway
- Romania
- Spain
- Sweden
- The Netherlands

If the number of replies increases significantly in future, a study per country would be carried out.

We thank all the participants their time.

Analysis of the replies

Replies come from people from different affiliations. A rough classification have been made, and results are shown in figure 1.

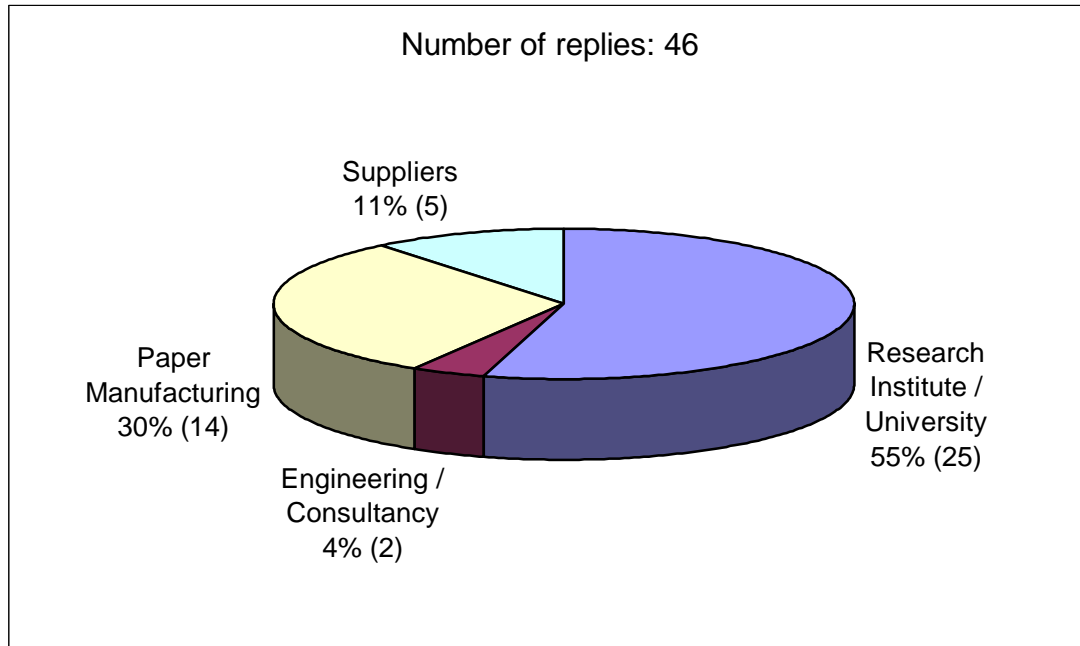


Figure 1 – Affiliation of participants.

Conclusions concerning the affiliations ‘Engineering/Consultancy’ and ‘Suppliers’ must be carefully analysed because they have been obtained from only 2 and 5 replies respectively.

67% of the repliers use simulation software. Table 1 summarises all the software packages used according to the replies.

Table 1 – Name of used software packages and number of replies using them.

Name of the software	Number of replies
Matlab (Simulink)	13
WinGEMS	7
FlowMac	4
Aspen-Hysis	3

Name of the software	Number of replies
Biowin	3
CadSim Plus	3
IDEAS	3
Balas	2
PS2000-GII (From CTP)	2
ACSL	1
C++	1
FcoSim Pro	1
Femlab	1
Fluent	1
Fortran	1
Modelica	1
PI	1
Siemens' tools	1
Witness	1

The importance of each criterion has been analysed and the general results have been summarised in table 2.

Results show that criteria concerning the supplier are the most important for people working in the pulp and paper industry. Both reliability of the software and reliability of the supplier are the most important criteria.

On the other hand, the possibilities of handling both chemistry and chemical reactions and compatibilities with other software packages are considered as the least important criteria. This points show that:

- Ambitious simulations involving several chemicals and chemical reactions are still seen as too complex and nonsense. Thus, people do not try to simulate them, because they probably think that there is not enough knowledge to trust in such simulations. Therefore, they look for easy software packages concerning chemical handling.
- People usually does not interconnect different software packages, but use only one software for one specific purpose.

Table 2 – Average importance of proposed criterions.

Importance of each specific criterion							
Criterion	Importance	Number of replies					
		very high (1)	High (2)	Average (3)	Low (4)	non important (5)	no opinion
General							
The total cost of the system, including training.	2.39	8	16	18	4	0	0
Payback time (what benefits do you expect ...).	2.17	15	16	10	2	3	0
Variety of applications and uses.	2.26	7	22	16	0	1	0
User friendliness / Training period.	2.19	10	20	13	3	0	0
Compatibility with a standard PC.	2.17	16	12	12	6	0	0
Time consumption (when building or running the simulation).	2.35	8	20	14	2	2	0
Reliability of the software (availability with years and future).	1.60	22	19	4	0	0	1
Average importance for this section	2.16						
Criterion	Importance	Number of replies					
		very high (1)	High (2)	Average (3)	Low (4)	non important (5)	no opinion
Related to supplier							
Reliability of the supplier (availability with years and future).	1.82	18	18	8	1	0	1
Licensing policy of the supplier.	2.38	7	18	16	4	0	1
Service and support (manuals /on-line help / help desk).	1.98	15	17	12	1	0	1
Average importance for this section	2.06						

	Importance	Number of replies					
		very high (1)	High (2)	Average (3)	Low (4)	non important (5)	no opinion
Software possibilities							
Possibilities of developing own tools or new blocks by creating / changing code scripts.	1.91	18	16	8	3	0	1
Possibilities of modifying existing blocks by creating / changing code scripts.	1.93	16	19	7	3	0	1
Possibilities of including several compounds.	2.09	7	26	11	0	0	2
Possibilities of handling both chemistry and chemical reactions.	2.47	9	12	15	7	1	2
Possibility to upgrade / update.	2.04	11	23	9	2	0	1
Quality of both Steady State and Dynamic validations (evaluation with standard samples).	1.98	12	21	9	1	0	3
Variety of Importing / Exporting tools (even while running simulations).	2.23	11	17	11	5	0	1
Compatibilities with other software packages.	2.43	9	17	8	10	0	2
Average importance for this section	2.14						

The same calculation have been carried out according to affiliation. Results are shown in table 3. People from research institutes or universities and people from paper manufacturing think in general the same about the criteria list. There are some exceptions:

- Payback time is logically more important for people from paper mills, while the variety of applications is more important for research centres and universities.
- Criteria related to supplier are in general more important for people from research centres and universities, specially in the case of the licensing policy.
- Criteria about the possibility of modifying existing blocks, handling chemistry and chemical reactions, and the variety of importing/exporting tools are important for research centres and universities, while paper manufacturers give them less importance, probably due to the fact that they are sceptic about complex simulations and they do not expect too much when using them.

Table 3 – Average importance of proposed criteria by affiliation
(1=very high, 2=high, 3=average, 4=low, 5=non important).

Criterion	Affiliation			
	Research Institute / University	Engineering / Consultancy	Paper Manufacturing	Suppliers
General				
The total cost of the system, including training.	2.40	2	2.36	2.6
Payback time (what benefits do you expect ...).	2.68	1.5	1.71	1.2
Variety of applications and uses.	2.00	2.5	2.71	2.2
User friendliness / Training period.	2.32	2.5	2.07	1.8
Compatibility with a standard PC.	2.04	3.5	2.43	1.6
Time consumption (when building or running the simulation).	2.24	3.5	2.21	2.8
Reliability of the software (availability with years and future).	1.58	2.5	1.57	1.4
Average importance for this section	2.18	2.6	2.15	1.9
Related to supplier				
Reliability of the supplier (availability with years and future).	1.75	3.5	1.93	1.2
Licensing policy of the supplier.	2.08	3.5	2.71	2.4
Service and support (manuals /on-line help / help desk).	1.96	2.5	2.14	1.4
Average importance for this section	1.93	3.2	2.26	1.7

Software possibilities	Research Institute / University	Engineering / Consultancy	Paper Manufacturing	Suppliers
Possibilities of developing own tools or new blocks by creating / changing code scripts.	1.83	1.5	2.00	2.2
Possibilities of modifying existing blocks by creating / changing code scripts.	1.75	1	2.29	2.2
Possibilities of including several compounds.	1.88	1.5	2.38	2.6
Possibilities of handling both chemistry and chemical reactions.	2.29	1.5	3.14	1.8
Possibility to upgrade / update.	2.08	1.5	2.21	1.6
Quality of both Steady State and Dynamic validations (evaluation with standard samples).	1.96	1.5	2.00	2.2
Variety of Importing / Exporting tools (even while running simulations).	1.96	2	2.53	2.8
Compatibilities with other software packages.	2.43	2.5	2.50	2.2
Average importance for this section	2.02	1.6	2.38	2.2

The other two affiliations (Engineering / Consultancy and Suppliers) are quite different in their interpretation. Suppliers give importance to criteria concerning general aspects of the software and the supplier, while the possibilities of the software are considered less important. People from Engineering/Consultancy group have the opposite opinion. They give far more importance to software possibilities than the other groups, and for them general criteria and those related to supplier are far less important than for the other groups.

A last question was made to consider suggestions to include new criteria to the list. The replies have been the following:

- Better possibilities for data exchange between different tools.
- Payback calculation and commitment.
- The possibility to present results in an easy way.

The survey form is presented in Annex 1. We are still working on it so, please, do not hesitate to fill it and send us a copy if you want.

ANNEX – 1

Users' Requirements for Simulation Software SURVEY MODEL

COST E 36
WG C

Software requirement evaluation survey

The following questions have been selected to classify the assessment criteria according to their importance for different user groups. Please answer them in order to elaborate a report with the results and discuss them in the frame of the COST Action E36.

Name and company:

Country:

Affiliation: *(Please tick appropriate box)*

Research Institute / University

Engineering / Consultancy

Paper Manufacturing

Suppliers

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

Users requirement specifications

The importance of the specific
criterion is to me
(please tick appropriate box)

Criterion	very high	high	Average	low	non important	no opinion
General						
The total cost of the system, including training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Payback time (what benefits do you expect ...).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Variety of applications and uses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User friendliness / Training period.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compatibility with a standard PC.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time consumption (when building or running the simulation).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reliability of the software (availability with years and future).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Related to supplier

	very high	high	average	low	non important	no opinion
Reliability of the supplier (availability with years and future).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Licensing policy of the supplier.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Service and support (manuals /on-line help / help desk).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Software possibilities

	very high	high	average	low	non important	no opinion
Possibilities of developing own tools or new blocks by creating / changing code scripts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possibilities of modifying existing blocks by creating / changing code scripts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possibilities of including several compounds.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possibilities of handling both chemistry and chemical reactions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possibility to upgrade / update.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality of both Steady State and Dynamic validations (evaluation with standard samples).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Variety of Importing / Exporting tools (even while running simulations).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compatibilities with other software packages.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Are you already using simulation software?

YES

NO

(If yes, please indicate the name(s)) _____

Would you like to include any further criteria that you miss? _____

Thank you for your collaboration!